US Army Corps
of Engineers
Construction Engineering
Research Laboratory

USACERL Technical Report P-90/33
September 1990
Facilities Engineering Application Program

Review of Field Test Evaluations of the Self-Help Management System Program

by
James H. Johnson
Michael J. Fuerst
John H. Williamson

The Self-Help Program at U.S. Army installations needed to improve the effectiveness of its Self-Help Service Center (SHSC) operations. The U.S. Army Construction Engineering Research Laboratory (USACERL) developed a prototype Self-Help Management System Program to provide automated support to SHSC Store operations. The prototype was tested in Directorates of Engineering and Housing (DEH) at three diverse Army installations. In every case, the automated program improved SHSC timeliness and effectiveness. The test and evaluations of the prototype program identified refinements that will be incorporated into the operational program. Implementation of the operational program is recommended and additional future applications are proposed.

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official indorsement or approval of the use of such commercial products. The findings of this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

DESTROY THIS REPORT WHEN IT IS NO LONGER NEEDED

DO NOT RETURN IT TO THE ORIGINATOR

USER EVALUATION OF REPORT

REFERENCE: USACERL TR P-90/33, *Review of Field Test Evaluations of the Self-Help Management System Program*

Please take a few minutes to answer the questions below, tear out this sheet, and return it to USACERL. As user of this report, your customer comments will provide USACERL with information essential for improving future reports.

1. Does this report satisfy a need? (Comment on purpose, related project, or other area of interest for which report will be used.)

_____

_____

_____

2. How, specifically, is the report being used? (Information source, design data or procedure, management procedure, source of ideas, etc.)

_____

_____

3. Has the information in this report led to any quantitative savings as far as manhours/contract dollars saved, operating costs avoided, efficiencies achieved, etc.? If so, please elaborate.

_____

_____

4. What is your evaluation of this report in the following areas?

   a. Presentation: _____

   b. Completeness: _____

   c. Easy to Understand: _____

   d. Easy to Implement: _____

   e. Adequate Reference Material: _____

   f. Relates to Area of Interest: _____

   g. Did the report meet your expectations? _____

   h. Does the report raise unanswered questions? _____

i. General Comments. (Indicate what you think should be changed to make this report and future reports of this type more responsive to your needs, more usable, improve readability, etc.)

_____

_____

_____

_____

_____

5. If you would like to be contacted by the personnel who prepared this report to raise specific questions or discuss the topic, please fill in the following information.

Name: _____

Telephone Number: _____

Organization Address: _____

_____

_____

6. Please mail the completed form to:

Department of the Army
CONSTRUCTION ENGINEERING RESEARCH LABORATORY
ATTN: CECER-IMT
P.O. Box 4005
Champaign, IL 61824-4005

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1990	Final

4. TITLE AND SUBTITLE
Review of Field Test Evaluations of the Self-Help Management System Program

5. FUNDING NUMBERS
FEAP project, "Self-Help DEH Systems"

6. AUTHOR(S)

James H. Johnson, Michael J. Fuerst, and John H. Williamson

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Construction Engineering Research Laboratory (USACERL)
PO Box 4005
Champaign, IL 61824-4005

8. PERFORMING ORGANIZATION REPORT NUMBER
USACERL TR P-90/33

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

USAEHSC
ATTN: CEHSC-FB-O
Fort Belvoir, VA 22060

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The Self-Help Program at U.S. Army installations needed to improve the effectiveness of its Self-Help Service Center (SHSC) operations. The U.S. Army Construction Engineering Research Laboratory (USACERL) developed a prototype Self-Help Management System Program to provide automated support to SHSC Store operations. The prototype was tested in Directorates of Engineering and Housing (DEH) at three diverse Army installations. In every case, the automated program improved SHSC timeliness and effectiveness. The test and evaluations of the prototype program identified refinements that will be incorporated into the operational program. Implementation of the operational program is recommended and additional future applications are proposed.

14. SUBJECT TERMS
Self-Help Management System Program

15. NUMBER OF PAGES
19

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	SAR

FOREWORD

This work was performed for the U.S. Army Engineering and Housing Support Center (USAEHSC) under Project "Self-Help DEH System," as part of the FY89 Facilities Engineering Applications Program (FEAP). Work was performed by the Facility Systems Division (FS) of the U.S. Army Construction Engineering Research Laboratory (USACERL). The USAEHSC Technical Monitor was Mike Smith, CEHSC-FB-O.

The USACERL Principal Investigator was John Williamson. Assistance was provided by Michael Fuerst and James Johnson. Dr. Michael J. O'Connor is Chief of USACERL-FS.

COL Everett R. Thomas is Commander and Director of USACERL, and Dr. L.R. Shaffer is Technical Director.

CONTENTS

SF 298 1
FOREWORD 2

1 INTRODUCTION 5
Background
Objective
Approach
Mode of Technology Transfer

2 PLANNING AND IMPLEMENTATION PHASES 7
Prototype Test Plan Development
Implementation of the Test Plan

3 PROTOTYPE PROGRAM EVALUATION 12
Basic Capabilities
Program Users' Evaluation
Suggested Program Improvements
Future Applications

4 CONCLUSIONS AND RECOMMENDATIONS 16

DISTRIBUTION

REVIEW OF FIELD TEST EVALUATIONS OF THE SELF-HELP MANAGEMENT SYSTEM PROGRAM

1 INTRODUCTION

Background

The Self-Help Program was conceived to encourage the family housing occupants on military installations to perform simple maintenance and repairs in their homes and immediate yard areas. Anticipated benefits were (1) reducing minor service calls to the installation's Directorate of Engineering and Housing (DEH), and (2) increasing the participating tenants' pride in protecting and maintaining their homes.

Self-Help Programs were implemented more than 20 years ago, and are now active at most U.S. Army installations. The DEH supervises the program through a Self-Help Service Center (SHSC). The SHSC consists of customer "how to" training facilities, some storage for large equipment, a consumables shelving area, and a store counter for interaction (issue/return) with the customer. Where most successful, the program has reduced costs, lightened the DEH workload, and offered prompt service to the family housing tenant.

In FY85, separate studies by Department of Defense (DOD), General Accounting Office (GAO), and Department of the Army (DA) concluded that the Self-Help Program was not achieving its expected goals. Although many factors were identified, the predominant theme was that family housing tenants were not motivated to participate.

USACERL investigations determined that the lack of motivation was due primarily to unfamiliarity with the system and to generally negative impressions. These negative impressions often were due to the observed congestion at the SHSC Store, coupled with insecurity over what methods and tools to use for specific tasks. If a new customer required information from a SHSC Store clerk who was occupied by a completely manual records system, the customer's skeptical perceptions were not improved by comments of other customers in the lengthening queue. The USACERL study showed that a greater emphasis on training and more responsive SHSC Store operations would be an important part of the DEH solution to the Self-Help problem.

In FY86-87, USACERL conceptually developed an automated SHSC operations support program. The system was designed to be compatible with the personal computer (PC) hardware available at most installations. Data entry would be either by the PC keyboard or by scanners applied to bar coded customer/inventory listings.

The design and development moved rapidly in FY88, and a prototype Self-Help Management System Program was ready for field testing in FY89.

Objective

The objective of this study is to evaluate the operations capabilities of the Prototype Self-Help Management System Program, as identified in multiple field tests at selected U. S. Army installations.

From this evaluation the feasibility of further development for the system, as well as an eventual Army-wide distribution, will be determined.

Approach

The field validation involved the following steps:

- Select three prototype test sites and assist these sites in obtaining computer hardware and software to support the test.
- Coordinate validation support plans at the selected test sites.
- Provide technical assistance to install hardware and test software.
- Monitor the progress of operations periodically, and identify when the operation is ready for testing.
- Measure test results, based on qualitative evaluations of test operations records and on-site surveys of DEH and maintenance management impressions, store customer satisfaction, and the general impact of the automated approach on store operations.
- Evaluate preliminary and final results to determine if the prototype program has performed within the criteria of a successful validation test.

An identification (measurement) of the levels of field test operations was to be established by a USACERL inspector who would survey the operations at each test location. The evaluation of these results is documented in this report. From these test results, the final configuration of an Operational SH Management System Program will be determined.

Three diverse but representative test sites were selected, and installation and operations procedures were coordinated with a DEH Self-Help Team at each site. The three test sites selected were Fort Devens, MA; Fort McClellan, AL; and White Sands Missile Range, NM. Through the cooperation of the DEH and maintenance management at these sites, the operations test of the Prototype Program was quickly achieved. By the end of CY88, existing SHSC Store personnel had installed necessary computer/printer hardware in the customer processing area, loaded the prototype program, and entered all local inventory and customer data. The prototype programs were in full operation at the three sites by January 1989. A "burn-in" period was allowed for debugging and system optimization before the Prototype Program Test began. "Burn-in" was supported from USACERL by modem linkages to the field-site computers, a procedure that allowed a direct upgrading of the test program. Most monitoring of the test site operations, identification of needed quick-fix corrections, and the general coordination between SHSC management or system users at each SHSC Store and the researchers at USACERL were handled by telephone.

Mode of Technology Transfer

Upon completion of field tests, the Self-Help Management System Program will be transferred to the U.S. Army Engineering and Housing Support Center (USAEHSC) for fielding and support.

2 PLANNING AND IMPLEMENTATION PHASES

Prototype Test Plan Development

The goal of the Prototype Program Test Plan was to demonstrate the software's ability to meet its design objectives, and to identify the value of an automated approach over the previous manual methods.

Functional Elements To Be Tested

Basic functions of the prototype program are shown in Figure 1. These functions include (1) the support to store operations and customer service, (2) some special store operations control and reporting functions for the SHSC Store management, and (3) long-term survey information for the DEH administration.

Functional elements of the program to be field tested included:

1. Customer Service

    a. Verify customer identification, location and issue status.

    b. Generate DD Form 1150 hard copies for customer/store records plus a database entry.

    c. Automatically generate a summary record of total issuance charges for each customer visit.

2. Store Service Operations:

    a. Verify each customer's authorization and identification; summarize loan status.

    b. Display on the PC monitor the current in-stock quantities of each item after its issue request.

    c. Automatically generate operation transaction records and update inventory accounts information.

    d. Display from the database the housing unit's inventory and status, then verify unit eligibility.

    e. Display, on request, inventory status of consumable and nonconsumable items.

3. Store Management Functions

    a. Store operations control

        - Generate SHSC inventory needs for the DEH Supply Office.

        - Enter SHSC management changes to the List of Qualified Customers or their usage limits restraints on the maximum number of items issuable to one customer.

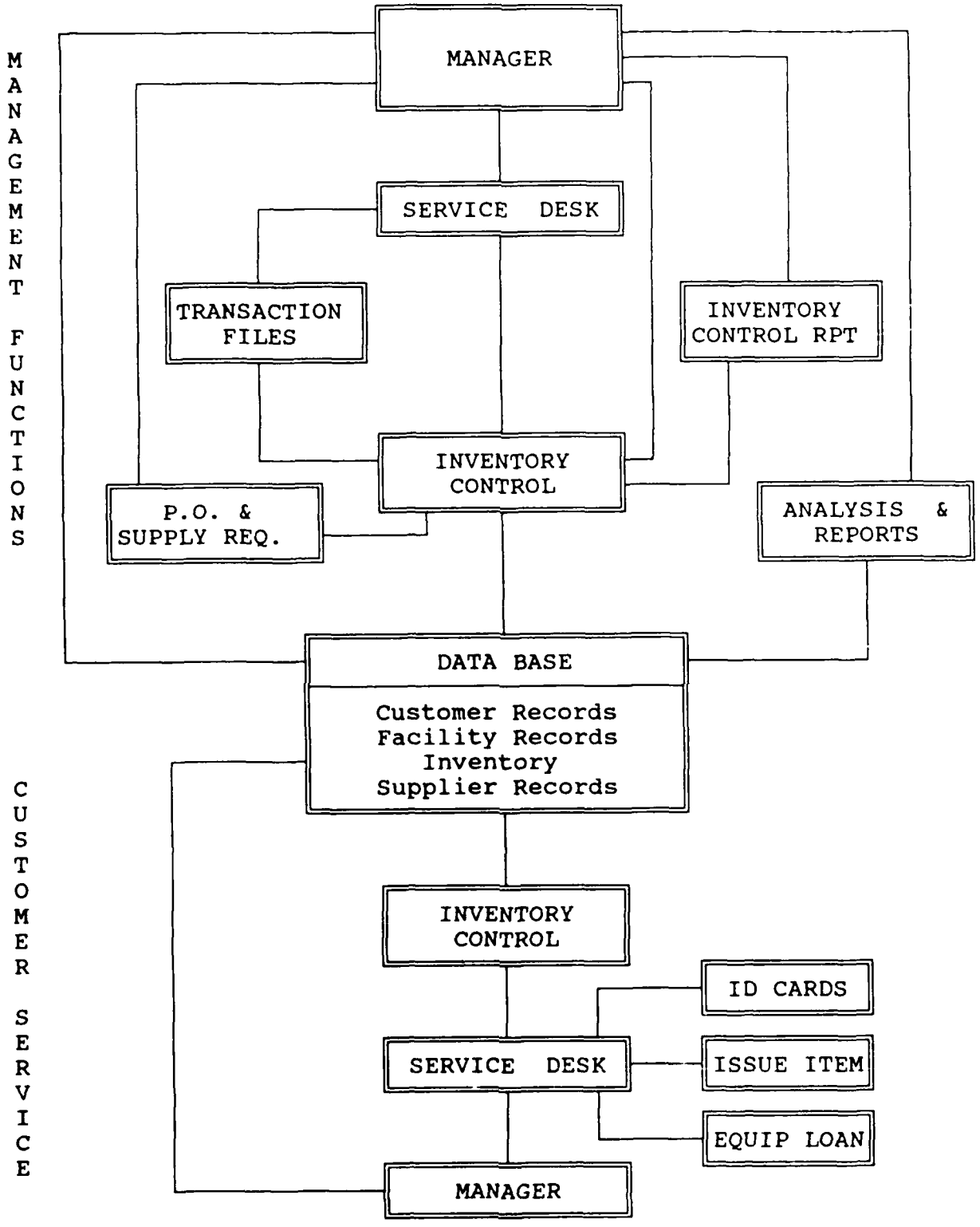

Figure 1. SHSC Management System interactions.

- Permit SHSC management to modify the list of inventoried items.

b. Store inventory control

- Automatically generate low-stock threshold flags and generate reorder requests to supply when requested.

- Identify item status in the Issue/Return mode, specifically whether the item is in the active inventory, under a resupply order, out for repair, or missing.

- Provide, on request, summary reports or item lists for any item-types which either are overdue, reordered, out for repair, or missing (any or all).

- Create inventory check sheets for bin counts to verify/update inventory levels.

- Permit SHSC management to adjust database records (edit inventory).

c. Store performance reports--Generate SHSC Store operation level and status reports for review by SH management and the DEH.

4. DEH Administration Support

a. Monitoring functions

- Item level usage by base area and by season.

- Customers' maximum use for each item.

b. Establishing issuance limitations

- Item level use by base area and by season.

- Customer maximum usage for selected items.

c. Removal/addition of classes of customers.

d. Removal/addition of inventory items.

e. Reporting of EHSC customer tallies for specified days and hours of the day.

Configuring the Test

A prototype software test implies an on-line operations test, with a check for basic functionality and a performance measurement system for identifying levels of operations improvement. The set-up, performance, and evaluation planning for the SHSC Program Test include:

1. Preparation planning

At the start, five areas of immediate support to the development of the test site would be required from the DEH. These were:

a. Determining the best physical arrangement in each SHSC Store for the microcomputer, keyboard, printer, and bar code reader.

b. Acquiring and installing needed hardware to support the SHSC Program as directed by maintenance management.

c. Installing the prototype program in accordance with USACERL instructions.

d. Training personnel to work in an automated SHSC store.

e. Loading the inventory and customer data for a representative operations test. Data loading was to be performed by a bar code reader or by the PC keyboard for each individual entry. The capability also existed for database loading directly from other systems, but this was not planned.

2. Operations Support Planning

The prototype program was to be placed in selected SHSC store operations where the system would provide total automation for equipment loan records, inventory control, receipt generation, and customer status identification.

The evaluation of prototype program test results was to be based on management interviews, reviews of store methods and procedures, solicitations of store users' comments on any functional complaints and overall satisfaction levels, and apparent customer satisfaction levels. All collected information was to be supported by observations of actual store operations.

3. Assessment Criteria

Since evaluations of the operations test depend largely on observations and perceptions of SHSC Store personnel, the quality of the evaluations in this report depends somewhat on the judgment of these system users. In interpreting comments, consideration was given to the varying levels of SHSC experience and the degree of familiarity with computerized systems.

Site visits were intended primarily to establish that the prototype program was functional and effective. This was accomplished through interviews with program users, examination of implementation

and operation records for the system, and an inquiry into management impressions. An important part of this investigation was to determine the effect of the software on operations in each SHSC store, including the answers to such questions as:

- "What were the responses of SHSC store workers and their customers to the unfamiliar assistance?"
- "What was the outcome of the operations problems that were encountered?"
- "What were the observed improvements in efficiency and productivity for each of the SHSC stores?"

Positive responses to operation performance questions and a site-verification of an operational system are the criteria for a successful completion of the test of the prototype program.

Implementation of the Test Plan

Installation Experience

Hardware Setup. The best location in each participating SHSC store was determined to be the customer counter with the printer immediately adjacent to the PC. Equipment security was an initial concern at one site, and a large special housing was used to bolt down the PC. Subsequently, this housing interfered with operations and was removed.

Bar Code System Implementation. The bar code reader system initially caused some implementation delays in that SHSC management did not fully understand the advantages of the system. Improved communications have eliminated this problem.

Selection of a bar code system to be used in the SHSC Store has been complicated by an incompatibility between the catalog bar code system of the Supply Office, the manufacturer's number, and the number assigned by the SHSC system. A closer coordination has been set up to resolve this procedural difficulty.

Data Loading. Loading the prototype program with inventory and customer data was a labor intensive operation. The DEH's at Fort Ord and Fort Lewis are developing simplified ways to load the self-help Management System database; software and documentation are expected to be available by June 1990.

Operations Start-up Experience

No unusual problems were encountered in the startup and initial operations of the prototype program. However, some burn-in adjustments were made to ensure smoother SHSC store operations and to improve the prototype program test package as provided.

3 PROTOTYPE PROGRAM EVALUATION

Bringing the prototype program online has resulted in streamlined SHSC store procedures to accommodate the new automation capability. These procedures, in turn, suggest greater automation support and are the source of the upgrading proposals of this chapter.

Basic Capabilities

All SHSC stores that participated in the test of the prototype program achieved increased operations effectiveness and efficiency. Store operators estimated customer queues were shortened by more than half, comparative runs show the time taken for data entry is 25 percent of what it was manually for both customer and inventory accounts, and a complete agreement was found that the automatic generation of needed receipt/report outputs is more accurate and convenient than with the previous manual system.

In addition, the prototype program has improved motivation of SHSC store workers, resulting in a greater interest in their work. The degree of attention paid to inventory records is now made more obvious by the immediate feedback of stock level information. Especially appreciated is the rapid identification and account status available for each customer being serviced.

Program Users' Evaluation

Prototoype program users uniformly are enthusiastic about the program's basic capabilities. They see these capabilities as the basis for the improved SHSC procedures, as well as the source of new program service proposals.

Basic Features

Two basic features of the prototype program, identified in the software's main menu as the "Issue/Receive" and the "Inventory Edit" modes, are now considered essential in SHSC stores where it is installed. (It is considered "unthinkable" that store operations would ever return to the manual method which has been replaced.)

Special Features

Very helpful features of the prototype program are the input system using the bar code reader and the customer identification and status call-up capability.

The bar code reader is especially helpful when many customers arrive with similar requests, and the possibilities are increased for distraction of the store worker from his/her keyboard entry. The system also has a potential for future expansion and procedural efficiencies.

The automated customer status review and the optional call-up of housing unit information are highly appreciated features of the Prototype Program. Especially in the case of transitional troops, the customer verification process has been greatly simplified. Shop personnel estimate the time spent on such "problem" customers has been reduced by two thirds with the automated system.

Problems

Some initial inconveniences were encountered with the printer and the small bar code wand. A "stop" was needed for the printer when reports, listings or flags were not wanted, but had been accidentally or automatically initiated. In some cases the pencil size bar code readers (wands) were too low in sensitivity, requiring many passes before registering the bar coded content. This problem is being resolved.

Suggested Program Improvements

User-Proposed Enhancements

Users have requested an expansion of automated support in inventory control and store operations monitoring, and for reports and records generation for store management and customer data.

Store Monitoring Functions

- Tools and Machinery: A repair and upkeep record of store-issued machinery (such as lawnmowers) could be correlated with its usage record to estimate an average Mean Time Between Failure (MTBF) and to determine if heavier duty equipment is needed.

- Usage Rates: The ability to identify peak seasonal usage for nonconsumables by the type of item and for consumables by the item and/or customers with the highest usage would provide needed accountability information to SHSC management.

- Inventory Integrity: When an "issue/return" (I/R) entry is recognizable as inappropriate or accidental, and when this entry affects the inventory count, the entry should be flagged by the prototype program and not accepted without confirmation by the user.

- Inventory Status: The system should be able to list formerly inventoried items that have been removed because of nonavailability either by item-type or by the reason for the removal.

- Active Accounts: A search-and-purge capability for inactive accounts could be added for the optional use of store management.

SHSC Management/Store-Operations Reports and Record. Periodic summary reports should be generated on request providing: Item Number, Item Name, Cost per Unit, Total Quantities Requested, and Total Funds Expended. Funding tallies are requested for dollar-volume reports by management, and should include specific item-types for monitoring inventory, and summaries of all of the items processed for identification of SHSC Store productivity. Specific requirements include: (1) Item-type Activity--Need a capability for daily/weekly/monthly tallies of Issue/Return actions for any item-type for SHSC Store logistics information; and (2) SHSC Store Activity--Need a capability for hourly/daily/weekly/monthly tallies of I/R actions (quantity and costs) by the Store for SHSC management information and IFS-M reporting.

Customer Records. Since time-consuming manual entries are no longer a factor in store operations, a complete customer record is now feasible.

- I/R Receipts: For tools or machinery, the customer's signed receipt should contain: item name and market price, serial number, known defects or special operating instructions, and due date.

- Usage Records: A quarterly printout of each customer's usage could encourage greater participation, and could serve as a customer's check on the accuracy of the store's accounts. This printout also could be used to identify and purge obsolete accounts. For example, if a customer entry showed no activity for two successive quarters, an occupancy status check for the housing unit could be made.

USACERL Evaluations

Implementation of the prototype program into the SHSC service has changed operations, which in turn has affected the prototype program. The following activities are being performed as a part of producing a deliverable configuration:

Enhanced Documentation. The revised SHMS program user's manual will define terms and clarify their relationships. For instance, store personnel seem to be confused as to what a "category" is, how or when a manfacturer's catalog number should be used, and how or when a serial number should be entered and tracked.

Development of Multi-Access Capability. If large operations are supported, multiple-user consoles (two or more) may be needed to process the workload expeditiously. Two or more consoles and keyboards, operating from the same database, will allow higher volumes and a more effective service. Such a capability also will permit a growth in usage and applications of the program.

Improved User Interface.

(1) Menu Relationships: Store operators' reluctance to use all the capabilities available in the prototype program could be due to the somewhat cryptic menu titles, and a menu hierarchy that was not completely understood. The menu scheme in the operational program will be designed to be more understandable. There should also be a clear indication whether a menu selection is merely for a data-base query, or whether it is for actual editing (entry addition/change) of stored information.

(2) New Services: New capabilities being studied for the operational program include the following: automatic look-up of common item names for equivalent inventory entries; (e.g., type in "HOSE" but read-out "GARDEN HOSE"); flags for new or discontinued consumable items, for low rates of usage, for a low inventory (but still above the reorder level), etc; a "reorder menu" that can provide a list of items reordered with their record numbers; and expansion of the available reports menu.

(3) Existing Service Upgrades: Some of the basic functional improvements being considered include:

Automatic printouts of reports/lists/flags will be optional; entry reject messages will provide elemental diagnostics or indicate possible reasons for the rejection; and an easier serial number entry and tracking mechanism will be provided.

Future Applications

Records could be created for all materials and equipment charged to a specific job account number. Purchase order (PO) information may also be required so that all PO numbers associated with a specific project number can be listed.

Some SHSC managers want to make local modifications to the program to support the unique requirements. Such independent modifications must be coordinated with the system developers or they could jeopardize follow-on software maintenance.

4 CONCLUSIONS AND RECOMMENDATIONS

The prototype program was tested successfully and was shown to satisfy all design objectives. The impact of the program on SHSC store operations was significant. All store functions improved significantly in accuracy, safety, and availability of records. The average performance time of individual transactions was shortened by a factor of one half to one third.

Field opinion at the three test stores was that it would be "unthinkable" for the SHSC Store to return to its old manual method.

After upgrading the operational SHMS Program to include the suggested enhancements, this program should be proposed for implementation Army-wide.

USAEHSC and USACERL should co-sponsor a User's Group to share the lessons learned, recommend further enhancements, and support the Army-wide implementation of the program.

USACERL DISTRIBUTION

Chief of Engineers
ATTN: CEHEC-IM-LH (2)
ATTN: CEHEC-IM-LP (2)
ATTN: CECC-P
ATTN: CECW
ATTN: CECW-O
ATTN: CECW-P
ATTN: CECW-RR
ATTN: CEMP
ATTN: CEMP-C
ATTN: CEMP-E
ATTN: CERD
ATTN: CERD-L
ATTN: CERD-C
ATTN: CERD-M
ATTN: CERM
ATTN: DAEN-ZCE
ATTN: DAEN-ZCI
ATTN: DAEN-ZCM
ATTN: DAEN-ZCZ

CEHSC
ATTN: CEHSC-ZC 22060
ATTN: DET III 79906
ATTN: CEHSC-F 22060
ATTN: CEHSC-TT-F 22060

US Army Engineer Districts
ATTN: Library (40)

US Army Engr Divisions
ATTN: Library (14)

US Army Europe
ODCS/Engineer 09403
ATTN: AEAEN-FE
ATTN: AEAEN-ODCS
V Corps
ATTN: DEH (11)
VII Corps
ATTN: DEH (16)
21st Support Command
ATTN: DEH (12)
USA Berlin
ATTN: DEH (9)
Allied Command Europe (ACE)
ATTN: ACSGEB 09011
ATTN: SHIHB/Engineer 09055
ATTN: AEUES 09168
USASETAF
ATTN: AESE-EN-D 09019

8th USA, Korea (19)

ROK/US Combined Forces Command 96301
ATTN: EUSA-HHC-CFC/Engr

Ft. Leonard Wood, MO 65473
ATTN: Canadian Liaison Officer
ATTN: German Liaison Staff
ATTN: British Liaison Officer (2)
ATTN: French Liaison Officer

USA Japan (USARJ)
ATTN: DCSEN 96343
ATTN: Facilities Engineer 96343
ATTN: DEH-Okinawa 96331

Area Engineer, AEDC-Area Office
Arnold Air Force Station, TN 37389

416th Engineer Command 60623
ATTN: Facilities Engineer

US Military Academy 10996
ATTN: Facilities Engineer
ATTN: Dept of Geography &
Computer Sciences
ATTN: MAEN-A

AMC - Dir., Inst., & Svcs.
ATTN: DEH (22)

DLA ATTN: DLA-WI 22304

DNA ATTN: NADS 20305

FORSCOM (28)
FORSCOM Engineer, ATTN: Spt Det. 15071
ATTN: DEH

HSC
Ft. Sam Houston AMC 78234
ATTN: HSLO-F
Fitzsimons AMC 80045
ATTN: HSHG-DEH
Walter Reed AMC 20307
ATTN: Facilities Engineer

INSCOM - Ch, Instl. Div.
Arlington Hall Station 22212
ATTN: Engr & Hsg Div
Vint Hill Farms Station 22186
ATTN: IAV-DEH

USA AMCCOM 61299
ATTN: AMSMC-RI
ATTN: AMSMC-IS

Military Dist of Washington
ATTN: DEH
Cameron Station (3) 22314
Fort Lesley J. McNair 20319
Fort Myer 22211

Military Traffic Mgmt Command
Falls Church 20315
Oakland Army Base 94626
Bayonne 07002
Sunny Point MOT 28461

NARADCOM, ATTN: DRDNA-F 01760

TARCOM, Fac, Div. 48090

TRADOC (19)
HQ, TRADOC, ATTN: ATEN-DEH 23651
ATTN: DEH

TSARCOM, ATTN: STSAS-F 63120

USAIS
Fort Huachuca 85613
ATTN: Facilities Engineer (3)
Fort Ritchie 21719

WESTCOM
Fort Shafter 96858
ATTN: DEH
ATTN: APEN-A

SHAPE 09055
ATTN: Survivability Sect. CCB-OPS
ATTN: Infrastructure Branch, LANDA

HQ USEUCOM 09128
ATTN: ECJ 4/7-LOE

Fort Belvoir, VA
ATTN: Australian Liaison Officer 22060
ATTN: Water Resource Center 22060
ATTN: Engr Studies Center 22060
ATTN: Engr Topographic Lab 22060
ATTN: ATZA-TE-SW 22060
ATTN: CECC-R 22060

CECRL, ATTN: Library 03755

CEWES, ATTN: Library 39180

HQ, XVIII Airborne Corps and
Ft. Bragg 28307
ATTN: AFZA-DEH-EE

Chanute AFB, IL 61868
3345 CES/DE, Stop 27

AMMRC 02172
ATTN: DRXMR-AF
ATTN: DRXMR-WE

Norton AFB, CA 92409
ATTN: AFRCE-MX/DE

Tyndall AFB, FL 32403
AFESC/Engineering & Service Lab

NAVFAC
ATTN: Division Offices (11)
ATTN: Facilities Engr Cmd (9)
ATTN: Naval Public Works Center (9)
ATTN: Naval Civil Engr Lab (3)
ATTN: Naval Constr Battalion Ctr 93043

Engineering Societies Library
New York, NY 10017

National Guard Bureau 20310
Installation Division

US Government Printing Office 20401
Receiving/Depository Section (2)

US Army Env. Hygiene Agency
ATTN: HSHB-ME 21010

Nat'l Institute of Standards & Tech 20899

Defense Technical Info. Center 22304
ATTN: DTIC-FAB (2)